

REMARKS

Applicants wish to thank the Examiner for the indication that claims 2, 4, 6, 8, 10, 12, 14 and 16 contain allowable subject matter. Claim 18 has been cancelled without prejudice or disclaimer. Claims 1-17 and 19-20 stand for consideration in this application.

Claims 1, 5 and 17-20 are rejected under 35 U.S.C. § 102(b) as anticipated by Rickrode (U.S. Patent No. 3,722,144); and claims 3, 7, 9, 11, 13 and 15 are rejected under 35 U.S.C. § 103(a) as obvious over Rickrode. Reconsideration and removal of these rejections are respectfully requested on the basis of the present amendment to the claims and the following remarks.

Applicants submit that Rickrode does not disclose a “shakedown brush” as called for in the present claims. The Examiner analogizes a “wire brush” disclosed by Rickrode to Applicant’s claimed shakedown brush. Although both of these elements are called a “brush”, they are completely different from each other in purpose, function and shape. While the wire brush as taught by Rickrode is a tool having a bundle of short wires for removing burrings and rust, the same is quite distinct from the Applicant’s shakedown brush, which is a component of a rotary electric machine for providing electricity to a coil in an armature and has a surface fitting to a periphery of a commutator of the armature. In terms of an effect, the present invention can make the surface properties of the commutator similar to the one obtained by a shakedown operation in a rotary electric machine by rubbing the surface of the commutator with a component having a similar contact shape and material to the one actually used in the rotary electric machine. The wire brush of Rickrode can merely remove burrings by “brushing” the

object. Therefore, the shakedown brush of the present invention is quite distinct from the wire brush as taught by Rickrode in construction and effect. Thus, claims 1 and 17 are not anticipated by, or obvious over, Rickrode.

Amended claims 1 and 17 patentably distinguish over the Rickrode reference for the reason above. Dependent claims 5 and 19-20, due to dependency, also patentably distinguish over Rickrode for at least the reasons that their base claims 1 and 17 patentably distinguish over the cited art.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

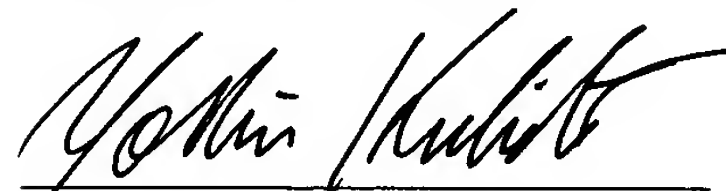
Attached hereto is a version with markings to show changes made.

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AMENDMENT UNDER 37 C.F.R. § 1.111
Appln. No.: 10/091,455

Attorney Docket No.: Q68494

Respectfully submitted,



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Date: June 6, 2003

APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE DRAWINGS:

Attached hereto is a Submission of Drawings.

IN THE SPECIFICATION:

The specification is changed as follows:

Page 2, paragraph 2, which bridges over to page 3:

Numerical reference 13 designates sliding traces produced by the rubbing motions of the brushes 11 against the surface of the commutator 5, wherein the sliding traces are schematically shown to indicate an area of the sliding traces. Because the brushes 11 are shaped as in FIG. 2, two sliding traces 13 are produced. As the brushes 11 wear out, the two sliding traces are gradually widened, and finally the entire sliding surfaces of the brushes rub against the commutator. The brushes 11 are shaped so that the both ends rub against the commutator 5 in order to progress aging between the brushes and the commutator 5 as early as possible in a primary stage after completing ~~to assemble~~ the assembly of the rotary electric machine, whereby noise is early reduced. This shape of the brushes 11 is adopted in conventional techniques.

Page 3, paragraph 1:

In the rotary electric machine constructed as described above, when the armature 3 rotates, the commutator 5, fixed by pressing into the shaft 4, rotates in the same direction at the same rotational speed as that of the armature 3. When the commutator 5 rotates, the brushes 11

slide on the surface of the commutator 5 and are pressed and in contact with the commutator 5 by the springs 12. In particular, immediately after completing ~~to assemble~~ the assembly of the rotary electric machine, a sliding condition between the surface of the commutator 5 and the brushes 11 is not stabilized. Therefore, in order to reduce noise caused along with the sliding motion by the brushes 11 and stabilize the performance of the rotary electric machine, a relatively small current is applied to the rotary electric machine after completing ~~to assemble~~ the assembly of the rotary electric machine, and the armature 3 is rotated to stabilize the sliding motion between the brushes 11 and the surface of the commutator 5. This is generally called “shakedown”, wherein because the shakedown process requires a substantial time, a drop of productivity and a cost increment are caused.

Page 3 paragraph 2, which bridges over to page 4:

Further, because a carbon coat is not produced on the surface of the commutator 5 immediately after completing ~~to assemble~~ the assembly of the rotational electric machine, a relatively large current applied to the rotary electric machine for measuring the performance is apt to generate spark. Therefore, the spark roughens the surface of the commutator 5, whereby noise is caused and lifetimes of the commutator and the brushes are shortened. To deal therewith, it is necessary to measure the performance after the shakedown process, whereby the drop of productivity and the cost increment are caused.

Page 9, paragraph 1, which bridges over to page 10:

As described, according to Embodiment 1, the shakedown brush 21 other than the brushes 11 is used to rub the surface of the commutator 5 in advance. Therefore, it is possible to

shakedown the surface of the commutator 5 in advance, a burr on the surface of the commutator 5 or the like can be removed, a sliding motion of the brushes 11 can be stabilized, noise of the rotary electric machine can be reduced in early stages, and the performance can be stabilized, whereby it becomes possible to reduce or ~~abolish~~ eliminate the aging process, productivity can be improved, and the cost of the rotary electric machine can be lowered.

Page 10, paragraph 1:

Further, since the surface of the commutator 5 is rubbed by the shakedown brush 21 other than the brushes 11, the carbon coat is produced on the surface of the commutator 5 in advance, and generation of spark is restricted to prevent the surface of the commutator 5 from roughening, whereby noise of the rotary electric machine can be reduced in early stages, and the performance can be stabilized, whereby it is possible to reduce or ~~abolish~~ eliminate the aging process, the productivity can be improved, and the cost of the rotary electric machine can be lowered.

Page 10, paragraph 2:

Further, since the width W3 of the sliding trace 22 of the shakedown brush 21 is larger than the sliding widths W1 and W2 of the sliding traces 13 of the brushes 11, even though positions of the shakedown brush 21 and the brushes 11 are misaligned in some degree, the carbon coat is produced on the surface of the commutator 5 in advance, whereby it is possible to reduce or ~~abolish~~ eliminate the aging process, the productivity can be improved, and the cost of the rotary electric machine can be lowered.

Page 11, paragraph 3:

Further, since the present invention is applied to motors for electromotive power steering device, particularly requiring low noise, the carbon coat is produced in advance, and a burr or the like is removed, it is possible to reduce or ~~abolish~~eliminate the long aging process, required in the conventional technique, and a mass production of rotary electric machines at a low cost becomes possible.

Page 12, paragraph 1:

Further, since the step of rubbing the surface of the commutator 5 by the shakedown brush 21 other than the brushes 11 in advance is provided, the carbon coat is produced by the shakedown brush 21 in advance, and a burr or the like on the surface of the commutator 5 is removed in advance, noise of the rotary electric machine is reduced in early stages, and the performance is stabilized, whereby the aging process can be reduced or ~~abolished~~eliminated, the productivity can be improved, and the cost of the rotary electric machine can be lowered.

Page 12, paragraph 3 , which bridges over to page 13:

Further, since the step of rubbing the surface of the commutator 5 by the shakedown brush 21 other than the brushes 11 in advance is provided while the armature 3 stands as a single unit, the carbon coat is produced on the surface of the commutator 5, whereby burrs and scars on the surface of the commutator 5 are removed by the shakedown brush 21, noise of the rotary electric machine can be reduced in early stages, and the performance can be stabilized, whereby it is possible to reduce or ~~abolish~~eliminate the aging process, the productivity can be improved, and the cost of the rotary electric machine can be lowered.

Page 13, paragraph 2, which bridges over to page 14:

Further, since the step of rubbing the surface of commutator 5 in advance without applying electricity to the shakedown brush 21, the surface of the commutator 5 is not ~~roughened~~ made rough by spark, noise of the rotary electric machine is reduced in early stages, and the aging process is reduced or ~~abolished~~ eliminated, whereby the productivity can be improved and the cost of the rotary electric machine can be lowered. Further, the number of the shakedown brushes 21 and the positions of the shakedown brushes 21 are freely set.

Page 14, paragraph 1:

Although, in FIG. 1, the example that the armature stands as the single unit has been described. However, the surface of the commutator 5 may be rubbed with the shakedown brush 21 other than the brushes 11 in advance after assembling the armature 3, the bracket 6, and the bearing 8, and rotating these by an external means. In this case, the carbon coat is produced by the shakedown brush 21 in advance, and a burr or the like on the surface of the commutator 5 is removed in advance, whereby noise of the rotary electric machine is reduced in early stages, and the performance is stabilized, whereby the aging process can be reduced or ~~abolished~~ eliminated, the productivity can be improved, and the cost of the rotary electric machine can be lowered.

Page 15, paragraph 1:

The first advantage of the rotary electric machine according to the present invention is that the aging process can be reduced or ~~abolished~~ eliminated, the productivity can be improved, and the cost of the rotary electric machine can be lowered.

IN THE CLAIMS:

Claim 18 is canceled.

The claims are amended as follows:

1. (Amended) A rotary electric machine comprising:

a commutator;

brushes sliding on a surface of the commutator; and

an armature,

wherein ~~the~~ said surface of the commutator is rubbed by a shakedown brush other than ~~the~~ said brushes in advance of assembling the brushes in the rotary electric machine.

3. (Amended) The rotary electric machine according to Claim 1,

wherein a sliding width ~~by of the~~ said shakedown brush is larger than a primary sliding width ~~with of the~~ said brushes.

4. (Amended) The rotary electric machine according to Claim 21,

wherein a sliding width ~~by of the~~ said shakedown brush is larger than a primary sliding width ~~with of the~~ said brushes.

6. (Amended) The rotary electric machine according to Claim 21,

wherein a material of ~~the~~ said shakedown brush is different from that of ~~the~~ said brushes.

10. (Amended) The rotary electric machine according to Claim 21,

wherein the rotary electric machine is applied to a motor for electromotive power steering device.

17. (Amended) A method of manufacturing a rotary electric machine including a commutator, an armature having the commutator, and brushes sliding on a surface of the commutator comprising the steps of:

~~a step of rubbing the surface of the commutator by using a shakedown brush other than the said brushes in advance; and~~

assembling the brushes in the rotary electric machine.